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ART. VIII. THE SPINELESS SOFT-SHELLED TURTLE,
AMYDA MUTICA (LE SUEUR), IN PENNSYLVANIA

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Atkinson (1901: 154) recorded *Amyda mutica* from Pennsylvania in the following words: "A specimen of this species was taken at Neville Island,¹ May 27, 1899. It must be very rare here." I had always been unwilling to accept this record, for three reasons: (1) the specimen was not preserved, and is, therefore, unavailable for re-determination; (2) no Pittsburgh specimens have come to light subsequently; and (3) the rivers near Pittsburgh have been productive of many exotic creatures, including alligators. Surface (1908: 120) listed *Amyda mutica* as of probable occurrence in Pennsylvania, solely upon grounds of geographic probability—Nash (1906: 17) having recorded a specimen from the Ontario side of Lake Erie. De Sola (1931: 155) stated, "It occurs in the western part of Pennsylvania along Lake Erie," a general statement probably attributable to Nash also. Recently, Nash's record has been considered invalid, and probably due to a misidentification (Logier, 1939: 57). Stejneger and Barbour (1933: 153, and 1939: 171) included "western Pennsylvania" in the range of the species. If I had thought to query either of these latter authors I might have learned earlier what has just been called to my attention by Coleman J. Goin and Roger Conant; namely, that there is an extant Pennsylvania specimen of *Amyda mutica*. Mr. Arthur Loveridge has kindly lent me this turtle for examination. It is MCZ 1911, collected by S. F. Baird in the Allegheny River at Foxburg, Clarion County, Pennsylvania. Although only moderate-sized (carapace length, 166 mm.), the specimen appears typical of *mutica*, for it has the anterior margin of the carapace smoothly rounded and without spines, and has circular nostrils which are not invaded by any projecting ridges from the nasal septum.

The Foxburg specimen cannot be suspected of being an escape, and its collection in the Allegheny River at an early date (Baird died in 1888) supports Dr. Atkinson's record of the species in the Ohio River below

¹A large island in the Ohio River about five miles northwest (downstream) from the business section of Pittsburgh.

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Pittsburgh some decades later. Although these records establish the occurrence of *A. mutica* in western Pennsylvania in the nineteenth century, they do not offer any evidence as to its present status. Consideration of this problem raises three questions, pertinent in nearly every study of the present distribution of an animal along the boundary of its range.

1. Has the collecting been adequate? The only answer to this question, as it relates to aquatic turtles in this state, is an emphatic "No!" No scientific stream survey program has been attempted in Pennsylvania, and herpetologists are notoriously dependent upon ichthyologists and commercial fishermen for good collections of soft-shelled turtles. In spite of inadequate collecting, however, occasional specimens of *A. spinifera* are secured in western Pennsylvania streams, and if *mutica* is coexistent in these waters it must be less numerous.

2. What natural barriers operated to limit the range of the species prior to human interference? Cahn (1937) states that *mutica* prefers running water, and hence is more frequently encountered in fluvial than in lacustrine habitats; whereas *spinifera* is essentially an inhabitant of quiet waters, either streams or lakes. Both species, of course, favor soft, sandy or muddy bottoms, and clear water devoid of vegetation. Except for short egg-laying excursions, *mutica* is rarely seen out of the water; whereas *spinifera* basks in the sun on convenient shores or logs with considerable frequency. More frequent emergence from the water, and less dependence on running water must give *spinifera* a definite migratory advantage in poorly drained regions where lakes are numerous and low divides may be straddled by swamps. This may explain the absence of *mutica* in the eastern glaciated region where the deposition of till completely upset the previous drainage pattern. The Pennsylvania localities for *mutica*, Foxburg and Neville Island, although in valleys affected by outwashed glacial materials, lie fifteen to thirty miles south of the Illinoian and Wisconsin boundaries, respectively. cursory examination of the maps showing the distribution of *mutica* in Illinois (Cahn, 1937: 179) and Ohio (Conant, 1938: 155) indicates that most, if not all, of the locality records for this turtle in these states lie outside the limits of Wisconsin drift. The extensive lakes associated with the waning of the Wisconsin ice sheet must have provided convenient migration routes for the lake-inhabiting *spinifera*. I am of the opinion, therefore, that *spinifera* reached Lake Champlain, where it still occurs, and the Finger Lakes, Mohawk River and upper Hudson, for which there are nineteenth-century records, in late glacial times. In line with this hypothesis, *spinifera* might have

reached the Finger Lakes during the Lake Iroquois stage,² that is, sometime after the Susquehanna outlet was interrupted, for there is no evidence that *spinifera* ever reached this river. Further extension of the range to the upper Hudson and Lake Champlain may have occurred in very late Iroquois times, after the Champlain Sea had retreated northward, but before the Mohawk outlet was severed.

3. What factors of human occupancy have tended to exterminate relict or peripheral populations, and to result in a contraction of the range of the species? Both species of soft-shelled turtles are equally prized as food, and there appears to be little evidence of differential persecution. Stream pollution, on the other hand, has probably affected the habitats of *mutica* more extensively than it has those of *spinifera*, for rivers and large creeks have undergone the most serious pollution. Furthermore, a stream, depleted of turtles by pollution, might possibly be re-invaded by *spinifera*, following purification; but upstream migration by *mutica* is almost prevented now by the large number of navigational and flood-control dams across our rivers. Pope (1939: 320) and others have reported congregations of *mutica* on the downstream side of dams, and no writer has, to my knowledge, mentioned any similar aggregation on the upstream side— cogent evidence that dams, and probably natural waterfalls, are serious barriers to upstream movements of *mutica*.

It appears safe to conclude that *Amyda mutica* once occurred in the unglaciated portions of western Pennsylvania in the Ohio and Allegheny rivers, that adequate collecting may bring to light relict populations of this turtle in suitable habitats, and that unpolluted stretches of the larger streams, especially below dams, merit particular attention.

² For readily comparable maps of the late stages see Fennemann, Physiography of Eastern United States, fig. 139.